REMARKS

Claims 1-9 are amended. Non-elected Claims 10-29 are canceled. Reconsideration of the application is requested.

Claims 1 and 6 are rejected under 35 U.S.C. §102(b) as being anticipated by JP 2-256839 (hereinafter referred to as JP '839). Claims 1, 2, and 6 are rejected under 35 U.S.C. §102(b) as being anticipated by Kamio et al. (U.S. Patent No. 5,333,584). Claims 3-5 and 7-9 are rejected under 35 U.S.C. §103(a) as being unpatentable over JP '839. Claims 3-5 and 7-9 are rejected under 35 U.S.C. §103(a) as being unpatentable over Kamio et al. Finally, claims 2 and 6-9 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. However, for the reasons set forth hereinafter, Applicants respectfully submit that all the claims now in this application distinguish over the cited references, whether considered separately or in combination, and fully comply with all requirements of 35 U.S.C. §112, second paragraph.

The present invention is directed to a method and an apparatus for controlling a motor-driven throttle valve for an automobile. For such a system, PID control is widely used to steadily control a throttle valve motor by decreasing a deviation between a target opening degree and a detected actual opening degree. A deviation, its integral value, and its differentiated value are obtained at a fixed timing under PID control. Then, each value is multiplied by a suitable constant (gain), and the motor is controlled by a sum of the multiplied values. A throttle valve deviation appears over a wide range, and different specifications are

demanded, depending on situations. For instance, when an engine is idling, the deviation is in a small range, and resolution control is demanded. On the other hand, when the automobile is running on a road, the deviation range is large, and responsive control is demanded. In order to cover both situations, a variety of gains is generally prepared and selected according to the situation.

In addition to deviation range, a temperature of the engine room influences the motor control. Generally, a resistance between terminals of the motor becomes large as the temperature of the winding of the motor goes up, and the torque constant becomes small. Further, the viscosity resistance becomes small as the temperature of the winding rises in the axis of rotation in which the lubricant is enclosed. The above-mentioned characteristics reverse when the temperature falls. This friction cannot be disregarded in the control of an electronically controlled throttle, although it is difficult to know a general temperature characteristic about static or dynamic friction which relates to the resolution when the throttle valve is controlled.

The invention currently defined by claims 1 and 6 solves the above problem by changing at least one gain parameter of the PID control according to a temperature of the motor. As shown in Fig. 1, thermometry control means 14 changes the PID gain according to a temperature of the motor using the temperature-PID gain map shown in Fig. 1(c). Therefore, the controller can keep accurate control for the motor and overcome fluctuation caused by temperature changes, such as changes in bearing grease viscosity or in impedance of the winding of the motor.

By way of contrast, JP '839 discloses a method to calculate a temperature of a

rotor by detecting the motor current. However, JP '839 neither teaches nor suggests controlling a throttle valve by PID gain parameters as currently amended claims 1 and 6 define. Kamio et al. disclose PID control for a throttle valve motor. However, while Kamio et al. disclose that a rounding unit changes a throttle open angle degree according to motor temperature, Kamio et al. neither teach nor suggest a controller that changes at least one gain parameter of the PID control according to a motor temperature as currently amended claims 1 and 6 define. Accordingly, Applicants respectfully submit that currently amended claims 1 and 6, and all claims of record in this application depending on claims 1 and 6, are patentable over JP '839 and Kamio et al.

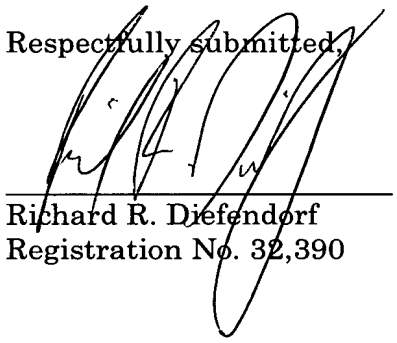
The claim amendments set forth above are made after consideration of the comments provided by the Examiner in section 10 on page 4 of the Office Action. It is respectfully submitted that all claims of this application now fully comply with the requirements of 35 U.S.C. §112, second paragraph.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an extension of time sufficient to effect a timely response. Please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #381NP/50868).

Respectfully submitted,

Date: July 26, 2004



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